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(54) IMPROVEMENTS IN OR RELATING TO
 GAMING APPARATUS

- (71) We, MULTI-AUTOMAT INDUSTRI AB, a Swedish Company, of Artillerigatan 23, 415 02 Gothenburg, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-
- The present invention refers to gaming apparatus. It is applicable to apparatus for playing roulette.
- Roulette games hitherto have been worked by at least one croupier and at larger gambling tables it may be necessary to use two croupiers. Ordinarily the staff also comprises a cashier, who attends to the change cash and in some cases also a chef de partie. As the staff must be paid whether a game is taking place or not, the wage account is an economically burdening factor. Another drawback with manually operated roulette is that it can only be played when the roulette is manned, which means that it is possible to play only during a few hours of the twenty-four hour day. A further drawback is the difficulty of maintaining effective control and follow up of the game by registration of the gambling course, stakes and so on.
- According to the invention, there is provided gaming apparatus, comprising: a gaming wheel which is rotatable in order randomly to select a winning result from a plurality of possible results; at least one gaming unit via which a player can predict the winning result, the unit including a gaming germinal having a set of prediction members in the form of electrical contact elements, in a number corresponding to the number of possible predictions and disposed as a pattern of electrically conductive material on an electrically non-conductive surface of said terminal, each of which contact elements being manually actuable to emit a first electrical signal representing a respective prediction; a driving device for rotating the gaming wheel; indication means for providing a second electrical signal representing said winning result; a comparator means arranged to compare the or each first electrical signal with the second electrical signal; and an indicator at the or each gaming unit, which indicator is connected to the comparator means and arranged to indicate whether or not any result predicted via that terminal corresponds to the winning result.
- For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings in which:-
- Figure 1 shows the fundamental design of a gaming machine in the form of a block diagram;
- Figure 2 shows a circuit diagram of the block diagram shown in Figure 1;
- Figure 3 shows the gaming machine in plan view;
- Figure 4 is a section along line IV - IV in Figure 3;
- Figure 5 shows in an enlarged scale the gaming terminal of the gaming unit; and
- Figure 6 shows a section through a portion of the gambling terminal.
- Figures 1 and 2 show a deposit device 1, for bills, counters, credit cards or the like, which device is provided with a terminal or card reader 2, by means of which an account number can be fed into the device. The account number together with a signal representing the amount of the deposit is then transferred to and stored in a computer 3 or in the memory 4 thereof. A gaming unit 5 includes a gaming terminal 6 and, if the deposit device 1 is not on line with the gaming unit, also a card reader 7 or another member by means of which the account number of the player can be fed into the gaming unit. This unit is provided with an indicator (counter) 8 for indicating the balance and an indicator 9 for indicating a poss-

ible win. The gambling terminal of the gambling unit is designed such, upon manual actuation, it emits selective prediction signals to the computer 3. This can be brought about in different manners, e.g. by so called touch buttons or by a contact pencil which when contacting a contact element emits a corresponding signal to the computer 3. Further details of unit 6 are shown in Figures 5 and 6.

It is conceivable to arrange a central gaming unit which is used by a number of players and where each player has his own contact pencil, but it is also conceivable that each player has his own gaming unit.

The gaming wheel is denoted 10 and it can be a roulette wheel or any other gaming wheel, which after having rotated through a number of revolutions indicates a winning position by means of an indicator 11. The indicator 11 is designed in such a manner that it will emit a signal representative of the winning position to the computer 3.

The computer is controlled by a program in such a manner that it can perform logical, arithmetical, registering and similar functions. The computer thus will compare the winning position with the stored prediction information, and if correspondence is present, the computer will calculate the resulting win or loss according to the relevant odds and the amount staked. This is then charged to the various accounts and displayed by balance and winning indicators 8, 9 at the gaming units. An output signal related to the winnings signal or loss signal can also be transferred to a disbursement device 12 or to an external card reader and indicator 13. The disbursement device 12 comprises a card reader 14, a balance indicator 15 and a discharge device 16 for bank notes. The player thus, by introducing his gaming card in the disbursement device 12, will get his winnings cashed. Instead of the automatic disbursement it is possible, if the gambling machine for instance is located in a restaurant, that the balance is read off at the external card reader 13, which for instance may be attended to by the head waiter of the restaurant.

In order to guarantee, at a possible break down, interruption in electricity supply or the like that the transactions made by the players and possible winnings are not erased, there is connected to the computer a registering output device 17 for instance a printer, a magnetic tape, a storage or the like, where all deposits on the card, as well as increases to or reductions from the accounts, removal of the card from the gaming machine and so on are registered. It is further possible to register the date and time so that after a break down or the like the result of the preceding gamble can be reconstructed and winnings can be paid out. With aid of a control monitoring device 18, which is connected to the computer, it is further possible to analyze all entering signals. Thus information may be received about the economy of the game and any undesirable ways of playing.

In Figure 2 is shown a circuit diagram showing the automatic system of the game. The gaming unit 5 thus includes a card reader 2, a logic card 19 and a prediction device 20, 21, together constituting the gambling terminal proper. The logic card is via an outer bus connected to the computer. If the gambling machine for instance includes 12 gambling units all these units are connected along said outer data bus. To this bus is further connected a logic card 23, which controls the deposit device 1 and a logic card 24 which controls the wheel 10. The outer bus is also connected to a verification unit 25 which completes the bus circle so that data which is entered at one end is verified when it again reaches the verification card. The verifications unit 25 also has the ability to disconnect the outer bus in the event that an error should occur, in order to ascertain that the logic which is in the inner bus can operate undisturbed. Connected to the inner bus are a central program unit 26, a program memory 27, a random access memory 28 and one or more terminal adapters 29, 29', to which is connected a registration output device 17, 17'. The random access memory 28 is used as an operation memory whereas the program memory contains the program which controls the entire automatic system of the game. The terminal adapter 29 is also provided with malfunction logic, which is used for detecting faults and which provides signals for disconnecting the outer bus at breakdowns and the like. Other output functions can be obtained from the terminal adapter, e.g. in the form of an acoustic alarm, when, for instance, anyone has pulled out a cable from the terminal.

The gaming wheel 10 is, in the embodiment shown, a roulette wheel, but it can instead be a so-called wheel of a fortune which stops at a randomly chosen winning position. Figures 3 and 4 show as usual a revolving wheel 30 with a number (e.g. thirty-six) of radially arranged pockets 31 intended for a ball 32. The revolving wheel is driven by means of a motor 33 in one rotational direction and the ball is introduced in the game by means of plunger in the opposite rotational direction. The discharge duct 35 is arranged tangentially relative to the fixed, slanting ball track 36 of the wheel. Inside this ball racetrack and just in front of the pockets 31 is arranged an outlet channel 38, the lower portion of which forms a seat 39 for the ball 32 and which channel can be closed by means of a closure member 37.

Two branch channels 40, 41 emanate from seat 39 and communicate with a discharge channels 35a and 35b, respectively. These discharge channels are directed in opposite directions so that alternative discharge directions can be chosen. The discharge of the ball is carried through by means of pressurised air via ducts 42 and 43, respectively. A photo electric detector 44 is arranged in the outlet tube adjacent the seat 39 and this detector senses whether the ball has reached seat 39 or not.

At the under side of the revolving wheel 30 just below each pocket 31 there is arranged a respective indicating peg 45. These pegs are sensed by a sensor 46, preferably a photoelectric device. A single further indication peg 47 is also arranged at the bottom side of the revolving wheel 30 at some distance from peg 45 and this peg 47 is sensed by means of a sensor 48. Signals from the sensors 46 and 48 are transferred to the computer 3 which thus will obtain a continuous indication of the positions of the pockets 31. Signals emitted by sensor 46 are taken to a counter which counts the number of pegs 45 passing sensor 46. Each signal from sensor 48, produced in response to the passage of peg 47, resets the counter, so that the counter is reset after each revolution of the wheel. By means of a further photoelectric sensor 49, which is arranged in the outer fixed portion 50 of the roulette every passing pocket 31 is sensed, whereby the beam of light from the light emitting part of sensor 50 is reflected to its photocell via the rear light reflecting wall 51 of the pocket 31. If the ball 32 lies in any of the pockets 31 the transmitter 49 thus will indicate this and the signal thus obtained is related to the count of the counter which indicates the position of the wheel. The computer thereby can positively establish the winning result.

The gaming machine shown in Figure 3 comprises besides the central fully automatic roulette wheel, a number of gaming units 5 arranged around the wheel. Each such gaming unit includes a gaming terminal 6, the structural design of which will be further described herebelow. Except for the gaming terminal, the unit also includes a contact pencil 52, a card pocket 53 with an associated card reader 7 and indicating means 8 and 9 for indicating balance and winnings. The unit 5 further includes an input terminal 54, comprising a number keyboard or the like and by means of which the amount of the stake can be selected. The unit further includes an operation contact device 55 by means of which preceding stakes or predictions can be retained for the next game. With the operation contact member 46 the entire gambling terminal can be reset.

The gambling terminal as shown in figures 5 and 6 comprises an upper, semitranspar-

ent circuit member 57 and a lower member 58 arranged at some distance from the upper one. At the upper side of the upper circuit card the pattern of the gambling terminal has been applied in the form of a hard chromium plated conductive material, the pattern of the gaming terminal thereby comprising 173 contact elements 59 corresponding to the number of possible predictions. Each scale numbering, designation, symbol and each prediction element in the diamond pattern system which is arranged around the numbers thus represents a contact element, which defines a certain prediction. The upper member 47 is supported on a screen grid or a grating 60 having square-formed apertures, whereby the grating is located in such a manner that below each element 59 there is arranged at least one square aperture. In the lower member 58 just below each hole in the grating 60, there is arranged a light-emitting diode 61, which is energised when the contact pencil 52 has been brought to contact the relevant contact element 59 in order to indicate that a prediction has been made. Depending on the type of prediction, several diodes may be energised, e.g. selection of a border line between two numbers will cause both numbers to be included in the prediction and both areas will light up. If a cross-formed contact element between four numbers is touched all these four numbers will be included in the prediction and the computer will register that the player identified by a certain account number has made his prediction in this manner. Each contact element 59 is led down to the lower side of the member 47, whereby the wiring is made such that it is located just above the partitions of the grating 60.

The gaming machine operates and is played in the following manner.

The player introduces a gaming card having a random account number in the deposit device 1 and deposits an amount of money in the bill machine. A card reader 7 in the deposit device reads the account number, which together with a signal representative of the deposit amount is transferred to the computer 3. The player thereupon brings his card to the gaming table where the card is inserted in the card pocket 53 of the gaming unit 5. If the game has not already begun the roulette wheel will be started and will revolve until the last man has removed his card. The card reader 7 transmits to the computer a signal indicating that a player identified by a certain account number takes part in the game and the balance of the player is indicated at the balance indicator 8 of the corresponding gaming unit.

The computer is programmed in such a manner that it continuously will read off all gaming units at short intervals. The player

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makes his prediction on his own gambling terminal 6 by means of his contact pencil 52 and in the event that arbitrary stakes are allowed, the amount of his stake can be selected by means of terminal 54, which is a number keyboard. A certain time is reserved in the computer program for the prediction procedure and the elapse of this time is indicated by an optical or acoustic announcement "no further bets" whereupon the ball 32 is discharged. (This can also be made a moment before the indication "no further bets".) As soon as the ball has fallen down into a pocket and comes to rest therein, (which is assumed when the same winning position has been sensed during several consecutive revolutions) the computer, which periodically obtains information about the position of the roulette wheel, will calculate the winning result which immediately is shown at the winning counter 9 of the winning player or players. A loss as well as possible winnings are counted down or up in the balance counter 8.

If the player by means of the operation contact device 55 has not indicated that an earlier made prediction is not to be retained, the indication lamp below the relevant contact element will be turned off. New predictions can thereupon be made. If the player removes his card from the playing unit this is indicated in the computer and this will reset the counters 8 and 9 and update the internally stored balance in the memory.

Payment of winnings can either be made via a disbursement device 12 in the form of a bank-note machine or by the staff in the gambling hall, who by means of a card reader 13 can establish how large is the balance sum of each account.

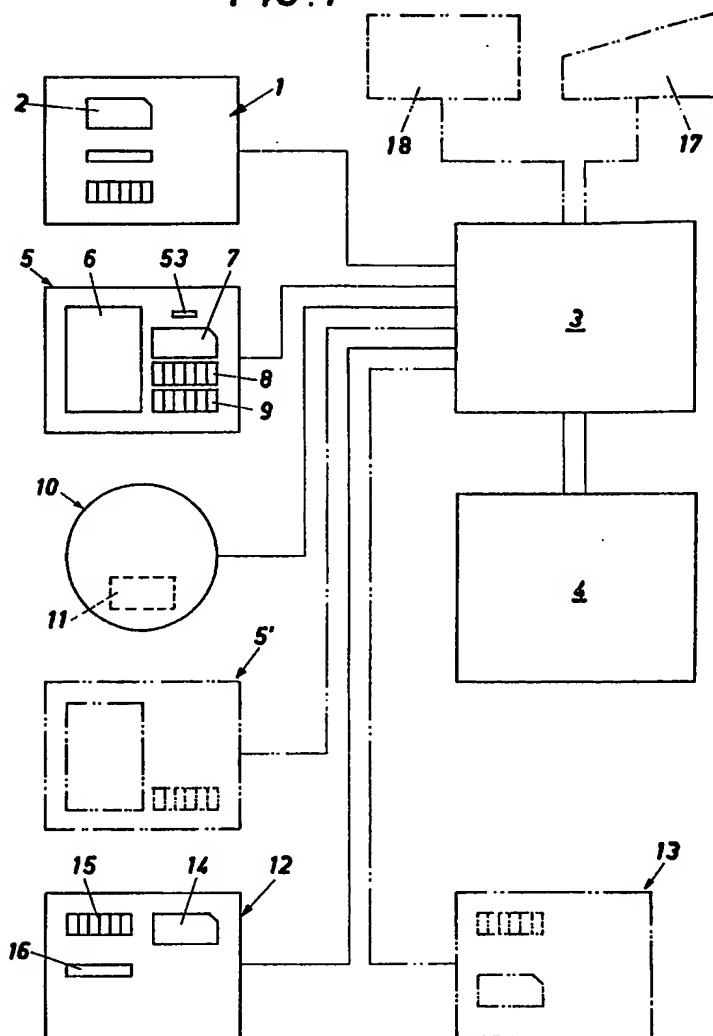
The shown and described embodiment of the invention is to be seen as an example and a plurality of variations are possible within the scope of the appended claims. It is thus conceivable that the deposit device 1 and the gaming unit 5 can be made as an integral unit. It is also conceivable that the deposit device 1 and the disbursement device 12 can be formed by a single device. The gaming unit 5 can be designed as a unit integral with the gaming wheel whereby a gaming unit can serve a plurality of players.

The gaming terminal and the gaming unit need not necessarily be arranged directly adjacent the roulette as it is perfectly conceivable to be in connection with a central roulette machine via e.g. a telephone network. The result of the winning number can in such case be displayed on a viewing screen.

WHAT WE CLAIM IS:-

1. Gaming apparatus, comprising: a gaming wheel which is rotatable in order randomly to select a winning result from a plurality of possible results; at least one gaming unit via which a player can predict the winning result, the unit including a gaming terminal having a set of prediction members in the form of electrical contact elements, in a number corresponding to the number of possible predictions and disposed as a pattern of electrically conductive material on an electrically non-conductive surface of said terminal, each of which contact elements being manually actuatable to emit a first electrical signal representing a respective prediction; a driving device for rotating the gaming wheel; indication means for providing a second electrical signal representing said winning result; a comparator means arranged to compare the or each first electrical signal with the second electrical signal; and an indicator at the or each gaming unit, which indicator is connected to the comparator means and arranged to indicate whether or not any result predicted via that terminal corresponds to the winning result.
2. Apparatus according to claim 1 wherein said pattern is formed by a printed circuit.
3. Apparatus according to claim 1 or 2 wherein said elements are actuatable by a human finger.
4. Apparatus according to claim 1 or 2 wherein the or each gaming unit is provided with a contact member for actuating said elements.
5. Apparatus according to claim 4 wherein said contact member is a contact pencil connected to an electrical source.
6. Apparatus according to any one of the preceding claims wherein a respective light source is provided below each contact element, said surface of said terminal is light permeable, and means is provided to ignite each light source upon actuation of its respective contact element.
7. Apparatus according to any one of claims 1 to 6 wherein the or each gaming unit is provided with an input device via which said player can select a stake which is thereby gambled on the outcome of the gaming wheel at odds dependent upon the prediction.
8. Apparatus according to any one of claims 1 to 6 wherein each said gaming unit is arranged to operate in such manner that a fixed stake is gambled on the outcome of the gaming wheel at odds dependent upon the prediction.
9. Apparatus according to claim 7 or 8 wherein there is provided at least one deposit device for bills, counters, credit cards or the like, which device is provided with means for the input of an account number and which is designed to emit an output signal representative of a deposited amount and associated with the account number which has been fed, said comparator means forming part of a computer

- adapted to perform logic, arithmetical and registering functions, said computer being arranged to process the output signal from the deposit device and the result from the comparator means, to determine winnings or losses of the or each player, the winnings of losses being displayed.
10. Apparatus according to claim 9 wherein there is provided a disbursement device connected to the computer and including a reader device for entry of the account number, an account balance indicator, and a money discharge device.
11. Apparatus according to any one of the preceding claims wherein said wheel is equipped with ball pockets, which in cooperation with a ball, indicates said winning result.
12. Apparatus according to claim 11 wherein said wheel is surrounded by slanting circumferential ball track, into which two tangential discharge channels open, said discharge channels being directed in opposite directions and connected to a discharge means for discharging the ball, the ball pockets being formed with open ends, which, at rotation, consecutively communicate with an outlet opening, which can be closed, and which via a return channel is connected to said discharge means which is arranged to cause said ball to be discharged alternately from each of the two ball discharge channels.
13. Gaming apparatus according to claim 12 wherein the rotatable wheel is equipped with first indicating members in a number corresponding to the number of ball pockets, said first indicating members during the rotation of the wheel being sensed consecutively by a first sensor, wherein the wheel is further equipped with a single second indicating member which is sensed by a second sensor; wherein signals emitted by the first sensor are brought to a counter, which counts the number of first indicating members sensed by the first sensor, wherein a signal from the second sensor resets the counter after each revolution of the wheel, and wherein a sensing member is arranged in the roulette table in front of the open end of each pocket to sense when the ball is in that pocket and thereupon to emit an output signal which output signal is compared with the count of the counter in order to establish the winning position.
14. Apparatus according to claim 12 or 13 wherein the discharge means includes a ball seat which communicates with the outlet opening and is located between two branch channels leading respectively to the ball discharge channels, there being arranged in each side of the ball seat a respective nozzle for selectively introducing pressurized air through the branch channels for discharge of the ball.
15. Gaming apparatus substantially as hereinbefore described with reference to, and as illustrated in, the drawings forming part of this Specification.
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FIG. 1

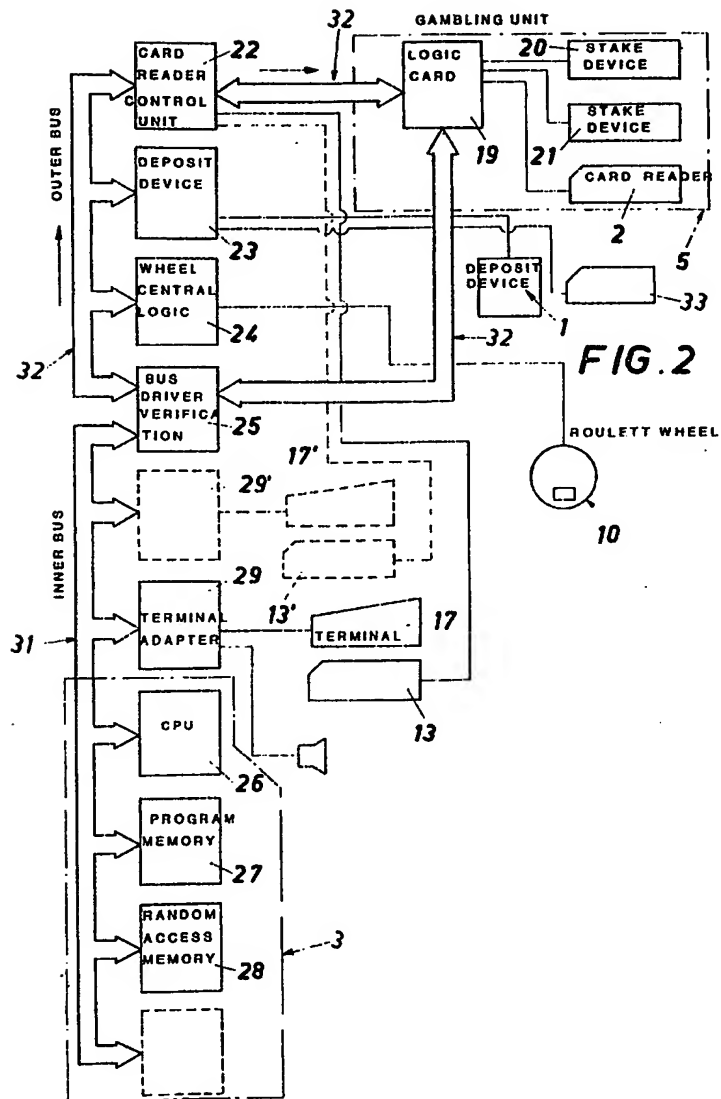


FIG. 3

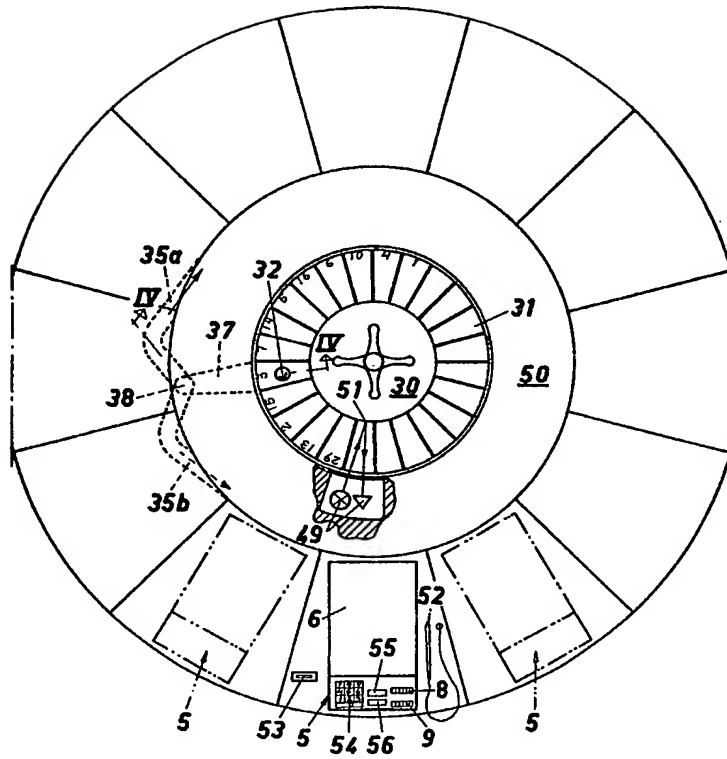




FIG. 5

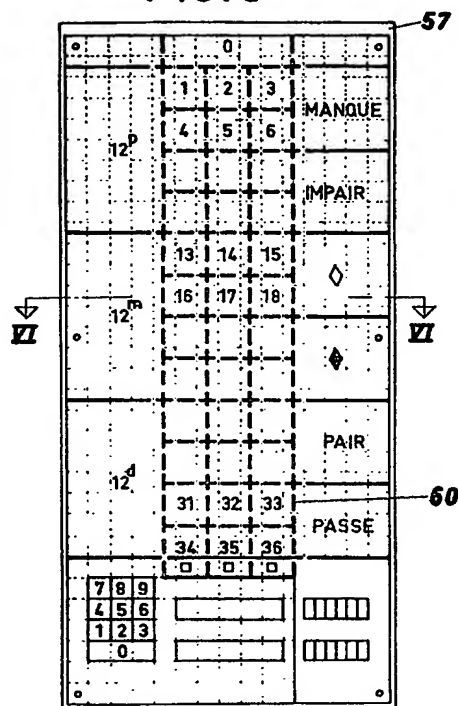


FIG. 6

